EAST PALESTINE TRAIN DERAILMENT AND CONTROLLED BURN:

ENVIRONMENTAL DATA REVIEW UPDATE AND INDEPENDENT STUDIES REVIEW

COMMUNITY WEBINAR SEPTEMBER 2024



ZOOM WEBINAR FUNCTIONS

- Please use the Q&A window to ask questions
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AGENDA

- Welcome!
- Background and Role of TASC Support
- Updates on East Palestine Environmental Data Available August 2023 – April 2024
- Questions and Discussion
- Independent Environmental and Public Health Studies Completed, Underway or Planned
- Questions and Discussion

This presentation is provided by the U.S. Environmental Protection Agency's (U.S. EPA's) Technical Assistance Services for Communities (TASC) program; its contents do not necessarily reflect the policies, actions or positions of U.S. EPA

BACKGROUND



WHAT HAPPENED?

On February 3, 2023, a Norfolk Southern freight train derailed in East Palestine, Ohio Twenty of the affected rail cars contained hazardous materials, including vinyl chloride, ethylene glycol, ethylhexyl acrylate, butyl acrylate and isobutylene

U.S. EPA staff arrived hours after the derailment and started monitoring the air for volatile organic compounds (VOCs)

U.S. EPA contractors installed booms and underflow dams to try and restrict the flow of contaminated water and collect floating material to lessen any possible impacts to the nearby Sulphur Run and Leslie Run streams Vinyl chloride in the derailed rail cars was considered unstable due to a drop in temperature discovered on Sunday night, February 5, 2023

According to Norfolk Southern, the pressure relief valves had stopped working on some of the cars, putting them at risk of exploding; Norfolk Southern made the decision to do a controlled release of the material into trenches dug in the ground where flares were lined up to ignite the chemical and burn it off

Prior to the controlled burn, the governors of Ohio and Pennsylvania ordered an immediate evacuation of a 1mile-by-2-mile area covering the eastern part of East Palestine and the Darlington area of Pennsylvania in Beaver County

MONITORING AND SAMPLING BEGAN IMMEDIATELY

- The derailed train caused a cascade of activity
- Emergency response workers were first on the scene, followed by officials and workers associated with a variety of federal and state agencies and representatives
- Emergency response workers focused on addressing immediate hazards posed by the derailment
- As part of the emergency response, federal and state agency responders also began extensive environmental monitoring (air, soil, surface water, sediment and biological [plants, fish])
- As part of ongoing studies to evaluate the derailed train impacts to human health and the environment, independent researchers conducted studies largely focused on determining effects to the community
- U.S. EPA made technical assistance available to the village of East Palestine



ROLE OF TASC SUPPORT



ROLE OF TASC SUPPORT

- U.S. EPA provided support to the East Palestine officials through U.S. EPA's Technical Assistance Services for Communities (TASC) program
- East Palestine officials wanted help in understanding the large amount of environmental data produced following spill/controlled burn
- TASC conducted an in-depth environmental data review, produced a report and fact sheet, briefed local officials, and hosted a community webinar
- TASC also reviewed City Park soils data collected



ROLE OF TASC SUPPORT

- Groups continued to collect data and conduct analysis in 2024
- East Palestine officials requested TASC to review and consolidate this information as new information becomes available
- East Palestine officials also requested a summary of other studies underway or being planned by other groups (not public agencies)



East Palestine Train Derailment and Controlled Burn: Environmental Data Review Update (August 2023 - April 2024)



Introduction and Purpose

On February 3, 2023, a Norfolk Southern freight train derailed in East Palestine, Ohio. Twenty rail cars contained hazardous materials. These materials included vinyl chloride, ethylene glycol, ethylnewyl acrylate, butly acrylate and isobutylene. Vinyl chloride in the derailed rail icars was considered unstable and potentially explosive. Rather than let an explosion happen, Norfolk Southern decided to do a controlled burn release of the vinyl chloride.

The derailed train caused a cascade of activities. Federal and state agencies began extensive environmental monitoring, including sampling and monitoring of air, drinking water, surface water, sediment, groundwater and soil. Other studies monitored and assessed potential chemical exposures for residents and responders.

U.S. EPA made its Technical Assistance Services for Communities (TASC) program available to support the vilage of East Palestine. In coordination with East Palestine officials, TASC prepared the East Palestine Train Derailment and Controlled Burn: Environmental Data Review Report. The report care out in October 2023. It describes the types of environmental data gathered to understand the contamination released during the train derailment and subsequent controlled burn accompliched as of August 1, 2023. It also summarizes assessment of chemical exposure (ACE) studies focused on public health. TASC compiled as much data as possible from publichy available resources for the report.



Sampling and monitoring continued beyond August 1, 2023 – the cut-off date for environmental data reviewed in TASC's October 2023 report. This fact sheet summarizes monitoring and sampling results from August 1, 2023, through April 19, 2024.¹

Summary of Completed Environmental Sampling and Results Since August 1, 2023

The purpose of environmental monitoring in and around East Palestine is to determine the type, amount and location of contamination, as well as possible human health impacts related to the release of the spilled materials and failout from the controlled burn. U.S. EPA took the lead, monitoring media of concern to the community (air, soil, surface water and sediment). Since the impacts of the derailment and controlled burn extended across state boundaries, representatives from the states of Ohio and Pennsylvania also provided support. Since contaminants could move downstream and affect neighboring communities, Allegheny County in Pennsylvania and two cities (Cincinnati, Ohio, and Louisville, Kentucky) also participated.

Table 1 lists the entities and the types of samples that TASC summarized in its October 2023 report. Since that time, U.S. EPA, Ohio EPA, Norfolk Southern and their contractors have collected data from more air, soil, surface water, sediment, drinking water (groundwater) and biological samples. Table 1 highlights the datasets updated since TASC's October 2023 report and summarized in this fact sheet.³

¹ The report, the report summary and the report presentation are available on the village of East Palestine's <u>Derailment Information Hub</u>.
² U.S. EMA'S TASC program provided the East Palestine Train Derailment and Controlled Burn: Environmental Data Review Report and this fact sheet. Their contents do not necessarily reflect the policies, actions or positions of U.S. EMA.

UPDATES ON EAST PALESTINE ENVIRONMENTAL DATA AVAILABLE AUGUST 2023 -APRIL 2024



TASC RESEARCH PROCESS

- TASC accessed and reviewed publicly available sources of environmental monitoring and sampling data
- These sources were accessed using the internet
- Many of the agencies worked together, therefore many resources are linked together







TYPES OF NEW ENVIRONMENTAL INFORMATION AVAILABLE FROM AUGUST 2023

	Entity										
Material	U.S. EPA	Ohio DNR ¹	Ohio EMA ²	Ohio EPA	PDEP 3	County 4	Ohio Dept. of Health	ORSA N-CO⁵	COC 6	City of Louisville	
Air	<mark>√</mark>				٧	٧					
Drinking Water			٧	<mark>۷</mark>	٧	٧	٧	V	٧	٧	
Surface Water	<mark>√</mark>			V	٧						
Sediment	<mark>√</mark>										
Groundwater				V	V						
Soil	<mark>√</mark>				V						
Biological ⁷		<mark>√</mark>		V	٧						

Table 1: Environmental Sampling Conducted to Date, by Material and Lead Party

Notes:

1. Ohio Department of Natural Resources

2. Ohio Environmental Management Agency

3. Pennsylvania Department of Environmental Protection

4. Allegheny County (air) and Columbiana County (drinking water)

5. Ohio River Valley Sanitation Commission

6. City of Cincinnati

7. Ohio EMA summarizes crop studies completed by the Ohio Department of Agriculture and Ohio State University.

✓ – Dataset amended since the October 2023 TASC report and incorporated into this fact sheet.



Samplo Dato

AIR

- Air is sampled and monitored using a variety of methods and has been ongoing since the derailment
- Results show volatile organic compounds (VOCs) detected above levels protective of human health on dates during the controlled burn and cleanup efforts; these samples are from locations near the derailment
- Monitoring of air using continuous and roaming methods identified some air quality concerns
- These potential impacts (poor air quality) were often short-term (hours in length) and occurred in areas near the derailment



East Palestine Train Derailment - Air Sampling Town of East Palestine, Ohio isclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a urvey. The map is for informational purposes. Map image is the intelectual property of Ean and is used herein under rease. Copyright 0 2020 Est and its licensors. All rights reasoured, Sources Est, Earthstar Goorgankics, Map date @ penStrotkApt contributors, Microsoft, Facebook, Inc. and its affiliates, Est Community Maps contributors, Map layer by al, Maxar and the U.S. EPA.

Air sampling locations in and around East Palestine

U.S. EPA AIR SAMPLING DASHBOARD WEBSITE AT THE TIME OF THE INITIAL TASC ENVIRONMENTAL DATA REVIEW

SEPA U.S. EPA East Palestine, Ohio Train Derailment Air Sampling Dashboard

i Show User Guide





AIR – KEY TAKEAWAYS

- Air monitoring and sampling information is provided to the public primarily through the U.S. EPA East Palestine web page
- Independent studies (to be discussed) support the U.S. EPA results
- Air quality concerns occurred at the time of the spill and controlled burn
- After those events, air quality recovered quickly, and concerns were rare and located in areas where removal activities occurred
- Current conditions show that air quality is good



Air

<u>Air Monitoring and</u>
 <u>Sampling Data</u>

Access to air monitoring and sampling data is available through U.S. EPA's East Palestine web page

DRINKING WATER/GROUNDWATER

- Drinking water sources in East Palestine and other drinking water sources downstream of the derailment are being monitored
- Sampling is also done on private wells of East Palestine residents; the results for private wells are shared with well owners and are not publicly available
- Data from public water supplies available August 2023-April 2024 continue to show that there are no derailment/controlled burn chemicals of concern impacting these sources

5	

OHIO EPA MAP OF GROUNDWATER FLOW AND MONITORING WELLS AT THE TIME OF THE INITIAL TASC ENVIRONMENTAL REVIEW



East Palestine Ground Water Source and Monitoring Wells



Monitoring wells currently in place

The main differences are:

- Additional wells installed to intercept the groundwater flow path, and
- Additional wells installed to test all possible flow paths from the derailment location

SUMMARY OF DETECTIONS IN EAST PALESTINE DRINKING WATER WELLS (PRE-TREATMENT) WATER: EAST PALESTINE PUBLIC WATER SYSTEM DATA (OHIO EPA) (INITIAL TASC ENVIRONMENTAL REVIEW)

Sample Locati Collection Date	ion	Chemical Name	N La	S ab	Ind (Si	dependent Lab ummit)	Units	Comments
5/23/2023 Vell w	rater entering nt (Well 3)	cis-1,3- dichloropro	N	S	0.7	79	PPB	Health standard for total 1,3- dichloropropene in drinking
	Sample Collection	dicinioropro	pene		Independent Lab			
	Date	Location	Chemical Name	NS L2D	(Summit)	Units Comments Health standard for total 1,3-dichloropropene in drin	king water is 0.47 ppb.	water is 0.47 ppb. Commonly
	5/23/2023	Well water entering the plant (Well 3)	cis-1,3-dichioropropene	NS	0.779	PPB Commonly used in farming to control nematodes. Th train derailment	is not associated with the	
	5/23/2023	Well water entering the plant (Well 3)	Tetrachlorcethene	NS	0.54	PB8 metal degreasing solvent. It is also used as a starting other chemicals and is used in some consumer products.	as a dry cleaning agent and material for manufacturing ucts.	used in farming to control
	5/23/2023	Well water entering the plant (Well 5)	cis-1,3-dichloropropene	NS	0.76	PPB Commonly used in farming to control nematodes. Th train derailment.	king water is 0.47 ppb. is is not associated with the	nematodes. This is not associated
	4/4/2023	Well water entering the plant (Well 1)	Di-n-butyl phthalate	≪RL	0.36	PP8 This is part of a group of chemicals used to make plas not associated with the train derailment.	stics more durable. This is	with the train derailment.
	4/4/2023	Well water entering the plant (Well 2)	Di-n-butyi phthalate	<rl< th=""><th>0.57</th><th>PPB This is part of a group of chemicals used to make plas not associated with the train derailment.</th><th>stics more durable. This is</th><th></th></rl<>	0.57	PPB This is part of a group of chemicals used to make plas not associated with the train derailment.	stics more durable. This is	
	4/4/2023	Well water entering the plant (Well 5)	Di-n-butyi phthalate	<rl< td=""><td>0.49</td><td>PPB This is part of a group of chemicals used to make play not associated with the train detailment.</td><td>stics more durable. This is</td><td></td></rl<>	0.49	PPB This is part of a group of chemicals used to make play not associated with the train detailment.	stics more durable. This is	
	3/28/2023	Well water entering the plant (Well 2)	Di-n-butyl phthlate	≪RL	0.76	PPB This is part of a group of chemicals used to make plat not associated with the train derailment.	stics more durable. This is	
	3/28/2023	Well water entering the plant (Well 5)	Di-n-butyl phthlate	<rl< td=""><td>0.33</td><td>PPB This is part of a group of chemicals used to make plat not associated with the train detailment.</td><td>stics more durable. This is</td><td></td></rl<>	0.33	PPB This is part of a group of chemicals used to make plat not associated with the train detailment.	stics more durable. This is	
	3/21/2023	Well water entering the plant (Well 1)	Di-n-butyl phthalate	< RL	0.42	PPB This is part of a group of chemicals used to make plas not associated with the train derailment.	stics more durable. This is	
	3/21/2023	Well water entering the plant (Well 2)	Di-n-butyl phthalate	< RL	0.56	PPB This is part of a group of chemicals used to make plat not associated with the train derailment.	stics more durable. This is	
	3/21/2023	Well water entering the plant (Well 5)	Di-n-butyi phthalate	< RL	0.42	PP8 This is part of a group of chemicals used to make play not associated with the train detailment.	stics more durable. This is	
	3/14/2023	Well water entering the plant (Well 1)	Di-n-butyl phthalate	<rl< td=""><td>0.23</td><td>PP8 This is part of a group of chemicals used to make pla: not associated with the train derailment.</td><td>stics more durable. This is</td><td></td></rl<>	0.23	PP8 This is part of a group of chemicals used to make pla: not associated with the train derailment.	stics more durable. This is	
	3/14/2023	Well water entering the plant (Well 2)	Di-n-butyi phthalate	≺RL	0.2	PPB This is part of a group of chemicals used to make plat not associated with the train derailment.	stics more durable. This is	
	3/14/2023	Well water entering the plant (Well 5)	Di-n-butyl phthalate	<rl< th=""><th>0.46</th><th>PPB This is part of a group of chamicals used to make plas not associated with the train detailment.</th><th>stics more durable. This is</th><th></th></rl<>	0.46	PPB This is part of a group of chamicals used to make plas not associated with the train detailment.	stics more durable. This is	
	3/7/2023	Well water entering the plant (Well 1)	Di-n-butyl phthalate	≪RL	0.19	PPB This is part of a group of chemicals used to make plas	stics more durable. This is	
	3/7/2023	Well water entering the plant (Well 2)	Di-n-butyi phthalate	<rl< td=""><td>0.34</td><td>PPB This is part of a group of chemicals used to make play not associated with the train detailment.</td><td>stics more durable. This is</td><td></td></rl<>	0.34	PPB This is part of a group of chemicals used to make play not associated with the train detailment.	stics more durable. This is	
	3/7/2023	Well water entering the plant (Well 5)	Bis(2-ethy/hexyl) phthalate	<rl< td=""><td>0.22</td><td>PPB of chemicals used to make plastics more durable. Thi train derailment.</td><td>g water, it is part of a group is is not associated with the</td><td></td></rl<>	0.22	PPB of chemicals used to make plastics more durable. Thi train derailment.	g water, it is part of a group is is not associated with the	
	3/7/2023	Well water entering the plant (Well 5)	Di-n-butyi phthalate	<rl< td=""><td>0.70</td><td>PPB This is part of a group of chemicals used to make plat not associated with the train detailment.</td><td>stics more durable. This is</td><td></td></rl<>	0.70	PPB This is part of a group of chemicals used to make plat not associated with the train detailment.	stics more durable. This is	
	2/28/2023	Well water entering the plant (Well 1)	Di-n-buty/ phthalate	<rl< td=""><td>0.49</td><td>PPB This is part of a group of chemicals used to make plas not associated with the train derailment.</td><td>stics more durable. This is</td><td></td></rl<>	0.49	PPB This is part of a group of chemicals used to make plas not associated with the train derailment.	stics more durable. This is	
	2/28/2023	Well water entering the plant (Well 2)	Di-n-butyl phthalate	≪RL	0.37	PPB This is part of a group of chemicals used to make plas not associated with the train derailment.	stics more durable. This is	
	2/28/2023	Well water entering the plant (Well 4)	Bis(2-ethylhexyl) phthalate	<rl< td=""><td>0.23</td><td>PP8 of chemicals used to make plastics more durable. This</td><td>is is not associated with the</td><td>20</td></rl<>	0.23	PP8 of chemicals used to make plastics more durable. This	is is not associated with the	20
	2/28/2023	Well water entering the plant (Well 5)	DI-n-butyi phthalate	<rl< td=""><td>0.39</td><td>PPB This is part of a group of chemicals used to make play</td><td>stics more durable. This is</td><td>20</td></rl<>	0.39	PPB This is part of a group of chemicals used to make play	stics more durable. This is	20

SUMMARY OF RECENT GROUNDWATER SAMPLING RESULTS PROVIDED ON U.S. EPA'S GROUNDWATER DATA WEBSITE (AS OF APRIL 2024)

Type of Well	Location	Date Sampled (2023)	Number of Analytes Tested	Number of Chemicals Detected
	SMW-04S	December 13	38	0
Sentinel	SMW-04S DUP	December 13	38	1
	SMW-08	December 13	35	1
	SMW-09	December 14	38	0
	SMW-18	December 19	37	0
	STW-29	December 8	37	0
Shallow	STW-31	December 8	37	0
	STW-32S	December 7	3	0
	MW-03	December 5	38	0
Deen	MW-05	December 6	37	0
	MW-07	December 6	37	0
	MW-10	December 14	3	0

DRINKING WATER – KEY TAKEAWAYS



- Drinking water continues to be monitored
- Sampling information is provided to the public through several resources including the Ohio EPA and Columbiana County Health District web page
- Currently, there is no indication of risk to East Palestine Public Water customers
- Treated drinking water shows no detection of contaminants associated with the derailment.
- Ohio EPA encourages people who have private wells to have it tested before using its water



SURFACE WATER AND SEDIMENT

- Surface water was sampled next to the derailment area shortly after the train derailment (about five days)
- Sampling was also done along streams that may carry spilled materials downgradient (higher to lower areas) to drinking water supplies; only a limited amount of data for surface water is publicly available
- Results of surface water samples collected show the presence of chemicals around the train derailment area that quickly became undetectable downstream
- Additional sampling is being planned this year (2024) by U.S. EPA and others
- For instance, as of July 28, 2023, U.S. EPA stated that "sediment and water sampling started on Sulphur Run to develop a characterization of the creek. Stream cleaning is on hold while sediment and water sampling goes on."

SURFACE WATER SAMPLING RESULTS

- U.S. EPA's database contains results from 16 samples taken from 13 locations gathered from the beginning of the emergency response (from February 4 through February 14, 2023)
- TASC summarized these results in its initial report-Ohio EPA
- Ohio EPA collects surface water samples from 20 locations beginning at the derailment site in East Palestine and progressing downstream to the Ohio River
- The agency evaluates water quality, sediment quality, bacteria, stream habitat, and biology (fish and insects)
- Results indicate that stream water quality is close to pre-derailment conditions

East Palestine Surface Water Sampling



Click the \bowtie icon on the map then select a sampling point (green or blue dot). Be sure to only select \bowtie screen to see the levels of each chemical at the selected site.

- Use bookmarks to view various map areas by clicking the 💷 icon.
- Display the map legend by clicking the 🗉 icon.
- Change the basemap by clicking the 🔢 icon.

SEDIMENT SAMPLING RESULTS

- U.S. EPA collected sediment samples on February 10, 2023, shortly after the derailment
- Data reflects conditions prior to cleanup actions
- The initial results showed that most of the contamination was limited to the derailment area



Sediment sampling locations and results

RECENT SEDIMENT SAMPLING RESULTS

Summary of Recent Sediment Sampling Results (July – November 2023)

Date (2023)	Number of Locations Sampled	Total Number of Analytes	Total Number of Chemicals Detected
July 26	1	84	31
July 27	2	168	10
August 1	1	42	9
August 9	11	42	2
August 10	2	84	6
August 11	3	215	32
November 3	1	47	7
November 6	11	47	4
November 7	2	94	15
November 9	1	47	11
November 10	4	235	25
November 13	1	47	9
November 14	3	141	8
November 15	1	46	3
November 20	1	187	15
November 21	2	235	33
November 27	3	120	4
November 28	3	234	9

- Environmental staff have collected about 230 sediment samples from strategic locations and analyzed for a select suite of contaminants
- Both surface sediment samples (0 to 6 inches in depth) and subsurface samples (6 to 12 inches in depth) collected
- Results show that chemicals detected but at low concentrations

SURFACE WATER AND SEDIMENT NEXT STEPS

- Detected chemicals in surface water remained below levels considered hazardous to human health and the environment
- U.S. EPA still urges area residents to avoid the creeks
- Ecological sampling was anticipated for 2023, results are pending (Ohio EPA)
- Environmental staff sampled sheen in response to community concerns





SHEEN SAMPLING

- U.S. EPA issued an order under the Clean Water Act requiring that Norfolk Southern conduct sheen investigations focused on oily sheens and sediments in Sulphur Run and Leslie Run (October 2023)
- Norfolk Southern assessed the creek at 739 locations downstream of the derailment and 89 background locations
- Preliminary results:
 - Oil-related compounds are predominant where sheen is present
 - Sheen is present when sediments are disturbed in more than half of the waterways

SHEEN RESULTS

East Palestine Derailment Qualitative Sheen Assessment Results

How to use this dashboard:

- . Select a stream segment in the map to the right. The selected stream segment will be highlighted in blue.
- The breakdown of sheen results for that segment will appear in the Sheen Observation Chart area below the map.
- Images from that segment will appear on the right side of the page. Use the scroll buttons on the left and right sides of the image to see other photos from that stream segment.



- In Leslie Run, 59% of locations had some sheen, compared to 66% of locations in Sulphur Run
- In background locations, 92% of areas had no sheen
- U.S. EPA's East Palestine Derailment Qualitative Sheen Assessment Dashboard provides a breakdown of the sheen results observed in each segment, as well as photos from different points along the segment

Figure 1. Screenshot of U.S. EPA's East Palestine Derailment Qualitative Sheen Assessment Dashboard

SURFACE WATER, SEDIMENT AND SHEEN – KEY TAKEAWAYS

East Palestine TRAIN DERAILMENT RESPONSE

Serving East Palestine, Negley, Darlington and surrounding communities

NEWSLETTER

July 10, 2024

U.S. EPA's East Palestine Train Derailment Response Newsletter available on-line includes ongoing updates about investigation and sampling activities

- Cleanup of Sulphur and Leslie Runs was completed in June 2024
- No moderate or heavy sheens were seen after multiple visual assessments, which included observations after disturbing the streambed and sediments
- Crews are now working on a full reassessment of both streams by collecting sediment samples at locations that were sampled in November and December 2023
- Six additional locations were added to expand the evaluation of creek cleanup needs
- Sampling will help determine if more cleanup is needed
- Additional full stream reassessments, including sheen scoring, are expected in the early fall and winter

SOILS

- Environmental staff tested soils immediately after and close to the derailment
- Analytical results for these soils found polycyclic aromatic hydrocarbons (PAHs) at levels higher than levels considered protective of human health
- The area where these samples were collected has been the focus of cleanup efforts – therefore, conditions have improved significantly

Sampling Location ilment Location Jk Southern Railroad Meth Tolue m,p-X	Analyte ne ne Icyclohexane	8.000	Dec				
illment Location Aceto Jlk Southern Railroad Methy Tolue m.p.x	ne ne Icyclohexane	8.000	nes	ult Final (mg	/kg)		
olk Southern Railroad	ne ne Icyclohexane	8.000					14
blk Southern Railroad Methy Tolue m,p-X	ne /Icyclohexane			7.9		0.25	Por harris a sure
Meth Tolue m,p-X	lcyclohexane		2.2	0.28	0.25	1.7	dian and the second
Tolue m,p-X				0.16	0.12		LINE R CONTRACT
m,p-X	ne			0.065		0.085	1.5° 1.1°
the second se	ylenes			0.098			501
o-Xyle	ene			0.099			Sulphur Run
Xylen	es (total)			0.2			-+-+
1-Met	hylnaphthalene	0.029					SO5 🔶
2-Met	hylnaphthalene	0.038					the second second second
Vinyl	chloride		4.6	3.9	5		165
1,2,4-	Frimethylbenzene			0.06			NAME OF THE OWNER OF
SVOC	s						Street C The second
Benzo	(a)anthracene	0.130					A AVEN
Benzo	(a)pyrene	0.11 J+				· · · · · · · · · · · · · · · · · · ·	or or an and a start of the start of the
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Benzo	(k)fluoranthene	0.069					the state of the state
Acena	phthene	0.025					
Acena	phthylene	0.029					
Anthr	acene	0.043					
Chrys	ene	0.120					
Diber	zo(a h)anthracene	0.023					A CLE S CHE
A Inden	o(1.2.3-cd)pyrene	0.084					
Pyren	e	0.26.1+					and the second second second
Fluor	anthene	0.180	14				
Fluore	ane	0.028					
Naph	thalene	0.028					and the second second
Penta	chlorophenol	0.050					
Penta	anthropo	0.120	14				
Phena	interie	0.120	14	0/100	2/120	2/120	
A Prequ	ency of Detected Analytes	20/131	4/128	9/128	3/128	3/128	Salar a state of the salar and the

Soil sampling locations and results

2,000 Feet

Last Modified: 5/17/2023



SOILS

- As of April 2024, U.S. EPA estimates that about 6,200 soil samples have been collected.
- The city park soils sampling is an example of the types of results that have been found
 - These results did not identify any contaminants at levels of concern
- Soil analysis results are provided through technical reports and posted in table summaries provided on U.S. EPA's website
- Soils sampling is being used to verify the completeness of soil removal activities

PHASE ONE SOILS DATA FROM U.S. EPA AND NORFOLK SOUTHERN

CO

East Palestine, Ohio Train Derailment

Phase One Residential, Commercial, and Agricultural Soil Sampling Results

On this Page:

- Summary of Soil Sampling Results
- <u>Results for Semivolatile Organics</u>
- <u>Results for Dioxin and Furans</u>
- Data Qualifies and Terms Key
- Norfolk Southern Data

Summary of Soil Sampling Results

Results for Semivolatile Organics

(The units of measure for analytes in the table below are in mg/kg)

Sample Collection Date	3/9/2023						
Sampling Depth in Inches	0-1	1-6	0-1	1-6	0-1		
Analyte (CAS No)	Validated	Validated	Validated	Validated	Validated		
Pyrene (129-00-0)	0.4 U	0.39 U	0.446 U	0.429 U	0.455 U		
Phenol (108-95-2)	0.4 U	0.39 U	0.446 U	0.429 U	0.455 U		
Pentachlorophenol (87- 86-5)	0.812 U	0.791 U	0.905 U	0.871 U	0.924 U		
Naphthalene (91-20-3)	0.4 U	0.39 U	0.446 U	0.429 U	0.197 J		

SOILS – KEY TAKEAWAYS

- The Phase 1 soil sampling results (as of April 2024) from 146 locations showed that properties are suitable for normal use, including recreation and gardening
 - Most results fell within typical background ranges for rural and urban/suburban soil
 - A few data points with higher results were associated with commercial/industrial properties or located on the public right of way (next to a road/highway)
- In mid-September 2023, the final site characterization process began
 - This process was designed as a "double-check" to make sure all derailment-related soil contamination has been identified and that cleanup has been successful
 - In all, more than 2,500 samples will have been collected through spring 2024 under this plan
- In October 2023, U.S. EPA published a technical report providing analysis of the soil sampling data confirming that the "vent and burn" did not significantly contribute to background dioxin deposition in the area
- Soils information indicates that potentially impacted soils are returning to pre-derailment conditions
- Sampling and verification are ongoing as part of completing removal action activities
- U.S. EPA will likely post final soils data on its website once this information is compiled

BIOLOGICAL MATERIAL – CROPS AND AQUATIC LIFE

- Ohio EPA and the Ohio Department of Natural Resources conducted fish surveys and other biological assessments to evaluate if Sulphur Run and Leslie Run were recovering
- Fish sampling results indicated that the waterways have mostly recovered to prederailment conditions
- The agricultural plant tissue sampling results gathered by the Ohio Department of Agriculture (ODA) and Ohio State University (OSU) College of Food, Agricultural and Environmental Sciences were finalized and documented
- Results show plant materials from agricultural sites in the East Palestine area are not contaminated with chemicals associated with the train derailment

Pennsylvania DEP Incident Response: East Palestine Train Derailment



PDEP Interactive Map Resource for Analysis Results

https://experience.arcgis.com/experience/685eede45e6d48e39f078583edccb e69

SUMMARY: ENVIRONMENTAL DATA REVIEW AND TASC LEVEL OF CONCERN

The Environmental Data Summary describes the additional data collected since August 2023 through to April 2024

Results did not show any new concerns and show that all the materials possibly affected by the derailment and controlled burn are returning to normal conditions

TASC summarized the resources (and associated web links) for each environmental material (such as air) and also provided an assessment of the level of concern based on the data reviewed

The assessment results were all considered to have a low level of concern

Environmental Data Reviewed and TASC Level of Concern Based on Data Reviewed

Affected Part of the Environment	Data Reviewed	Level of Concern Based on Data Reviewed
Air	Allegheny County, Air Quality. www.alleghenycounty.us/Services/Health-Department/Air-Quality aspx.	Low
<u> </u>	U.S. EPA. Air Sampling Data. <u>www.epa.gov/east-palestine-oh-train-derailment/air-sampling-data</u> . Air Monitoring and Sampling Data. <u>www.epa.gov/east-palestine-oh-train-derailment/air-monitoring-and-sampling-data</u> .	Low
Drinking Water	Columbiana County Health District: East Palestine Drinking Water Sampling Results. www.columbiana-health.org/resources.	Low
Ĩ.	City of Cincinnati. Ohio River Test Results. <u>www.cincinnati-oh.gov/water/news/</u> <u>Qbig-river-test-results-show-no-contaminants</u> .	Low
6	Louisville Water. <u>louisvillewater.com/news/louisville-pure-tap-water-you-can-trust</u> <u>is-safe</u> . Data Chart. <u>louisvillewater.com/wp-content/uploads/2023/02/022123-Lab-Results-</u> <u>Chart.pdf</u> .	Low
	Ohio EPA. East Palestine Drinking Water Test Results. <u>epa.ohio.gov/monitor-</u> <u>pollution/pollution-issues/east-palesting</u> , East Palestine Municipal Drinking Water Results. <u>epa.ohio.gov/divisions-and-offices/drinking-and-ground-</u> waters/reports-and-data/ep-drinking-water-results.	Low
	ORSANCO Data Download. www.orsanco.org/wp-content/uploads/2023/05/East- Palestine-Train-Derailment-Data-from-GCWW-PUBLIC-050323.pdfDerailment-	Low
	Pennsylvania Department of Environmental Protection (PDEP). East Palestine Train Derailment: PDEP Interactive Map Address (Public Water and Private Wells). experience.arcgis.com/experience/685eede45e6d48e39f078583edccbe69.	Low
Surface Water	Ohio EPA. East Palestine Surface Water Sampling. <u>epa.ohio.gov/divisions-</u> and-offices/Surface-water/reports-data/ep-surface-water-results. Surface Water Sampling Map.geo.geo.abio.gov/portal/apps/ dashboards/9ce820a86edd48b7bd0f0e5365552d14.	Low
	PDEP. East Palestine Train Derailment: PDEP Interactive Map Address. experience.arceis.com/experience/685eede45e6d48e39f078583edccbe69.	Low
Sheen	U.S. EPA. Water Sampling Data. <u>www.epa.gov/east-palestine-oh-train-derailment/</u> water-sampling-data. ³	Low
	U.S. EPA. Qualitative Sheen Assessment Results. <u>www.epa.gov/east-palestine-oh-</u> <u>train-derailment/qualitative-sheen-assessment-results</u> .	Low
Groundwater	Ohio EPA. Summary of Detections in East Palestine's Wells. <u>epa.ohio.gov/static/</u> Portals/47/citizen/response/East-Palestine-RawSummaryofDetections.pdf.	Low
	PDEP. East Palestine Train Derailment: PDEP Interactive Map Address – Groundwater. <u>experience.arcgis.com/</u> <u>experience/685eede45e6d48e39f078583edccbe69</u> .	Low
Soil	PDEP. East Palestine Train Derailment: PDEP Interactive Map Address – Soil. experience.arcgis.com/experience/685eede45e6d48e39f078583edccbe69.	Low
Æ	U.S. EPA. Soil and Sediment Sampling Data. <u>www.epa.gov/east-palestine-oh-train-</u> <u>derailment/soil-and-sediment-sampling-data</u> . City Park Soil Sampling Results. <u>www.epa.gov/east-palestine-oh-train-</u> <u>derailment/city-park-soil-sampling-results</u> .	Low
Biological	Ohio Department of Natural Resources (Ohio DNR). Update on East Palestine Train Derailment Impact to Wildlife. <u>ohiodnr.gov/discover-and-learn/safety- conservation/about-ODNR/news/Train-Derailment</u> . Ohio DNR Map of Aquatic Species Collection Sites (Fish Kill Monitoring Stations). <u>mcusercontent.com/9762d9943f454cab103416c32/files/08564e87-6b3e-f32b-</u> 1b4b-4f7c5632d4e4/NS_East Palestine Fish_Survey_Map_Updated.pdf.	Low
	PDEP. East Palestine Train Derailment: PADEP Interactive Map Address - Plants. experience arreis.com/experience/685eede45e6d48e39f078583edcrbe69	Low

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QUESTIONS AND DISCUSSION





East Palestine Train Derailment and Controlled Burn: Environmental Data Independent Studies Review



Introduction and Purpose

On February 3, 2023, a Norfolk Southern freight train derailed in East Palestine, Ohio. Twenty rail cars contained hazardous materials. These materials included vinyl chloride, ethylene glycol, ethylhexyl acrylate, buryl acrylate and isobutylene. Vinyl chloride in the derailed rail cars was considered unstable and potentially explosive. Rather than let an explosion happen, Norfolk Southern decided to do a controlled burn release of the vinyl chloride.

The derailed train caused a cascade of activities. Federal and state agencies began extensive environmental monitoring, including sampling and monitoring of air, drinking water, surface water, sediment, groundwater and soil. Other studies monitored and assessed potential chemical exposures for residents and responders.

U.S. EPA made its Technical Assistance Services for Communities (TASC) program available to support the village of East Palestine. In coordination with East Palestine officials, TASC prepared the East Palestine Train Derailment and Controlled Burn: Environmental Data Review Report. The report came out in October 2023. It describes the types of environmental data gathered by federal, state and local government agencies to understand the contamination released during the train derailment and subsequent controlled burn accomplished as of August 1, 2023. It also summarizes assessment of chemical exposure (ACE) studies focused on public health. TASC compiled as much data as possible from publicly available resources for the report.



The report did not encompass studies completed by other independent entities such as area universities. This review summarizes the studies – completed and ongoing – conducted by these entities. ^{1, 2}

The Importance of Additional Research and Monitoring

The purpose of environmental monitoring in and arcund East Palestine is to determine the type, amount and location of contamination, and possible human health impacts related to the release of the spilled materials and fallout from the controlled burn. Federal, state and local government agencies, including U.S. EPA, took the lead by monitoring media of concern to the community (air, soil, surface water and sediment). In addition, agencies associated with understanding the derailment impacts on human health assected possible heads thi impacts on area residents and emergency responders by completing several ACE studies. These agencygenerated monitoring efforts were made publicly available. They are described in TACCS October 2023 Environmental Data Review Report and Report Update covering August 2023 through April 2024.

The community and area universities recognized the need for gathering and understanding independently generated information. The community reached out to several institutions for their assistance. Public health-related entities such as university researchers supported by the National Institute of Environmental Health Sciences (NIEHS) also designed studies to evaluate health impacts in the community. These independent efforts include research studies as well as assistance programs. The studies focus on questions such as "what are the health effects caused by the train derailment-related chemical exposure?" The assistance programs include support from university staff to help with answering questions raised by the community and media. This review provides a summary of the findings of these additional independent studies/assistance programs.

¹ The report, the report summary and the report presentation are available on the village of East Palestine's Derailment Information Hub (https://eastpalestine-oh.gov/derailment-information-hub/).

² U.S. EPA's TASC program provided the East Palestine Train Derailment and Controlled Burn: Environmental Data Review Report and this review. Their contents do not necessarily reflect the policies, actions or positions of U.S. EPA. OVERVIEW OF EAST PALESTINE ENVIRONMENTAL AND PUBLC HEALTH INDEPENDENT STUDIES COMPLETED, UNDERWAY OR PLANNED



HOW AND WHY ARE INDEPENDENT RESEARCHERS INVOLVED?

- The community and area universities recognized the need for gathering and understanding independently generated information
- The community reached out to several institutions for their assistance

- These independent efforts include research studies and assistance programs
 - Research studies focus on questions such as "what are the health effects caused by the train derailment-related chemical exposure?"
 - 2. Assistance programs include support from university staff to help with answering questions raised by the community and media

INDEPENDENT STUDIES OVERVIEW

- TASC identified 11 train derailment-related independent studies/assistance programs, all led by or coordinated with university researchers
- Several of these studies overlap or are coordinated among the researchers
- All the studies focus on addressing community concerns
- Most of the studies include community involvement



HEALTHY FUTURES RESEARCH STUDIES: HEALTH EFFECTS STUDY AND AIR POLLUTION STUDY

Case Western University

"Healthy Futures Research Study: Linking Somatic Mutation Rate with Baseline Exposure in East Palestine"

- <u>Summary</u>: This study is seeking participants from the area who dealt with chemical exposure in the aftermath of the train accident.
- The research team will study the biological impact of chemical exposures on the short- and long-term health of residents by measuring DNA damage.
- <u>Status:</u> Ongoing. The research team is developing a Community Advisory Board (CAB) to guide future participant recruitment and advocacy efforts.

Texas A&M University

"Responding to Air Pollution in Disasters (RAPID) Air Sampling and Symptom Monitoring in East Palestine, OH"

- <u>Summary:</u> The objective of this project is to apply mobile air sampling strategies with health assessment and communication tools to rapidly describe health risks from volatile organic compound (VOC) exposure during the cleanup and recovery phases of the train derailment.
- <u>Status: Some information is available that agrees</u> with EPA air monitoring, and additional information is forthcoming.

TOXIN HEALTH EFFECTS STUDY



University of California

"Uncovering the Short-Term Public Health Impact of Toxin Release in East Palestine, Ohio: Outcomes and Effect Modifiers"

- <u>Summary</u>: This study aims to gather information from residents in East Palestine and the surrounding area, to potentially understand the tie (when present) between train derailment exposures and the emergence of new health problems.
- The study includes optional blood tests, optional wristbands for toxin exposure assessments, and online surveys to document past, current and future health outcomes.
- <u>Status:</u>Ongoing

HEALTH TRACKING STUDY

University of Kentucky

"East Palestine Train Derailment Health Tracking Study"

- <u>Summary</u>: This study tracks the long-term health of all participants. Health conditions and symptoms will be mapped to look for "hot spots" and trends over time.
- This project will target effective communication for East Palestine and surrounding community residents.
- Status: Ongoing



UNIVERSITY OF PITTSBURGH HEALTH STUDIES

"Profiling the Post-accident Exposome in East Palestine"

- <u>Summary</u>: This study will characterize how contaminants move in the environment, exposure and human health risk related to the derailment chemical releases.
- It will collect 75 soil, water and sediment samples (from impacted areas) and analyzed for dioxins, furans, chlorinated furans, polycyclic aromatic hydrocarbons, chlorinated polycyclic aromatic hydrocarbons and polychlorinated biphenyls.
- The study will evaluate potential human health risks associated with exposure to the tested chemicals.
- <u>Status</u>: Beginning stages of design are ongoing.

"East Palestine Community-Engaged Environmental Exposure, Health Data, and Biospecimen Bank"

- Summary: This study emphasizes the timeliness needed to capture human and environmental impacts from the train derailment given the volatile nature of the contaminants and the high level of stress in the community.
- It uses a citizen science approach, engaging the community from start to finish.
- Status: Ongoing

INDOOR AIR MONITORING COMMUNITY STUDY

- Summary: The East Palestine community-organized independent indoor air monitoring study collected indoor air readings in buildings across the greater East Palestine area
- A resident conducted the study with fellow community members and independent research consultants
- University of Kentucky researchers support part of the study's air sampling activities
- Researchers are conducting one of the NIEHS-supported studies



COMMUNITY SURVEY RESULTS, RESEARCH STUDY ON COMMUNITY EXPERIENCES RELATED TO WATER, HOME, AND ENVIRONMENTAL IMPACTS AFTER THE EAST PALESTINE CHEMICAL SPILL AND FIRES



University of Illinois Chicago, Cleveland State University and Purdue University

Community Survey Results

- <u>Summary</u>: A team of researchers conducted a community survey and interviews to understand people's experiences related to water, home and air impacts after the train derailment.
- The goal of the research is to identify public attitudes about water, air and soil safety as well as how the crisis has impacted homes and the environment.
- <u>Status</u>: Completed. A report summarizes the research and is available to the public.

OHIO/PENNSYLVANIA CHEMICAL SPILL PUBLIC HEALTH RESPONSE, PURDUE UNIVERSITY, CENTER FOR PLUMBING SAFETY

Purdue University

Ohio/Pennsylvania Chemical Spill Public Health Response, Purdue University, Center for Plumbing Safety

- <u>Summary</u>: The Purdue University Center for Plumbing Safety led a volunteer response team to help community members better understand key public health and safety questions.
- The volunteer response team includes experts in environmental and civil engineering, soil science, environmental chemistry, atmospheric science, geosciences and agriculture, among other disciplines.
- <u>Status:</u> The team posts information about its efforts and discoveries on its website.
- The team has compiled available information on the website and has provided several presentations to the East Palestine community.



CENTER FOR ATMOSPHERIC PARTICLE STUDIES, AIR QUALITY AND CLIMATE: AIR QUALITY DATA REVIEW

Texas A&M University Superfund Research Center/Carnegie Mellon University

"Air Pollutant Patterns and Human Health Risk following the East Palestine, Ohio, Train Derailment"

- <u>Summary</u>: Independent data collection by Texas A&M University's Superfund Research Center and Carnegie Mellon University corroborated U.S. EPA's findings on air quality in East Palestine.
- Researchers conducted mobile air quality sampling on February 20 and February 21, 2023.
- Results indicated that average concentrations of benzene, toluene, xylenes and vinyl chloride were below minimal risk levels protective of human health.
- These results coincide with U.S. EPA results.
- <u>Status</u>: Completed. A report summarizes the research and is available to the public.

KENT STATE EXPERTS WEIGH IN ON AFTERMATH OF EAST PALESTINE TRAIN DERAILMENT

Kent State University

Kent State Experts Weigh in on Aftermath of East Palestine Train Derailment

- Summary: Media outlets contacted Kent State University faculty members to lend their expert opinions and insight on cleanup work, air monitoring and water testing.
- Faculty who conducted media interviews include Dr. David Kaplan, professor in the Department of Geography and director of the Environmental Studies Program, and Dr. Kuldeep Singh, Ph.D., assistant professor in the Department of Earth Sciences.
- Status: Completed. Media coverage with the Kent State experts can be found on their website.



INDEPENDENT STUDIES SUMMARY

- Most of these efforts are ongoing
- Most of these studies rely on community involvement
- All these independent research efforts are focused on serving community interests
- The points of contact and associated websites for each study is provided in the fact sheet

Table 1. Summaries of East Palestine Independent Study/Assistance Programs.

A F Re	Study/ ssistance Program ference #	University	Principal Investigator	Study/Assistance Program Title	Website Link
Hea <u>htt</u>	lthy Futures os://healthy	s Research (Ongoing <mark>futuresresearch.org</mark>	Studies and Assist	ance programs)	
1	-///-	Case Western Reserve University	Fredrick R. Schumacher, PhD, MPH	Healthy Futures Research Study: Linking somatic mutation rate with baseline exposure in East Palestine	https://reporter.nih.gov/s earch/_dDrxmiihUmy2ZF4 tCEuVA/project- details/10819613
2_	-	Texas A&M University	Natalie Johnson PhD, Associate Professor	Responding to air pollution in disasters (RAPID) air sampling and symptom monitoring in East Palestine, OH	https://reporter.nih.gov/s earch/mDz9cUh_HkWlaG OcnMOtrg/project- details/10819836

QUESTIONS AND DISCUSSION





THANK YOU!

FOR INFORMATION ABOUT THE TRAIN DERAILMENT AND RESPONSE AND TO ACCESS THE LATEST TASC FACT SHEETS, GO TO THE "HEALTH AND SAFETY PAGE" AT <u>EPOHIO.ORG</u>

HTTPS://EPOHIO.ORG/HEALTH-SAFETY/

